

PerformAIRE WEATHER CENTER



[Weather and Prediction System](#)

U.S. PATENT #5,509,295

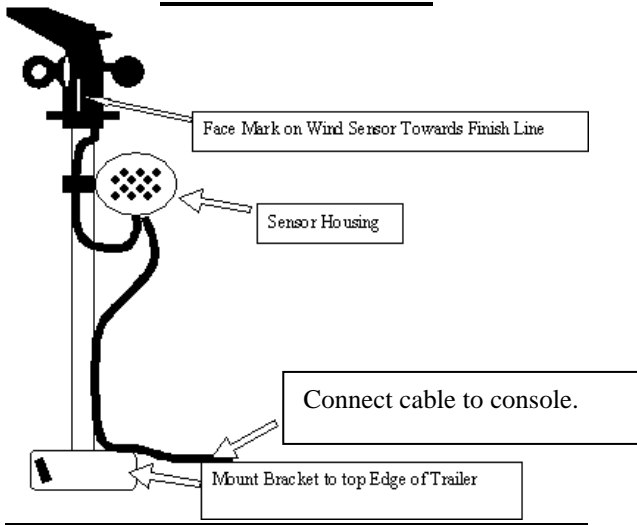
Invented and Manufactured
By

ALIRONICS inc
*Performance
Electronics*

PerformAIRE **WEATHER CENTER FEATURES**

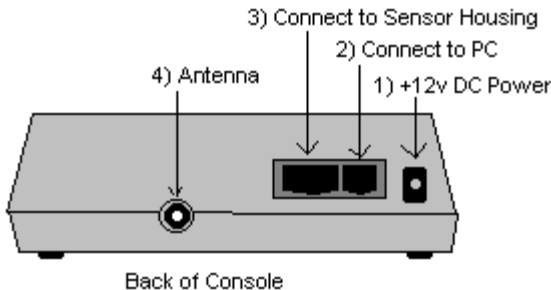
- Temperature Readout
- Relative Humidity Readout
- Absolute Barometric Pressure Readout
- Vapor Pressure
- Grains of Water
- Dew Point
- Oxygen Sensor Readout (optional)
- Density Altitude Readout
- Oxygen Altitude Readout
- Wind Speed/Gust and Direction (optional)
- Remote Paging Capability (optional)
- 400 run data base
- Up to 10 separate data bases
- Sea level ET calculation
- Throttle stop ratio calculation
- ET to DA Ratio
- ET prediction
- Throttle stop prediction
- One run prediction
- Wind effect prediction
- Run completion
- Bad Run Detection
- Data and time stamp in data base
- Weather on Hold
- Manual weather input
- Automatic Last weather sample Hold
- View and delete runs
- Downloading Data Analysis software (optional)
- Backlit Display

SYSTEM SETUP



Mounting Sensors

- 1) Connect Pole Mount securely near top of trailer. Additional mount supplied for holding in trailer during transportation.
- 2) Connect sensor housing and wind sensor to Pole as shown.
- 3) Mount pole-mount style wind sensor on top of post on tighten retaining ring.
- 4) Insert Sensor Pole in mount and turn so mark on wind sensor is pointing toward finish line of track then tighten.
- 5) Plug in 4-pin wind sensor cable to sensor housing and plug in 8-pin sensor housing cable from console.
- 6) **SENSOR POLE SHOULD NOT BE LEFT UP WHILE TRAVELING!**



There are only four connectors on the console unit.

- 1) Connect interface cable to COM PORT (default com port 1) on PC if purchased.
- 2) Connect 8-pin cable from sensor housing. See Cable Lock below.
- 3) Connect antenna cable to console. (Paging option only)

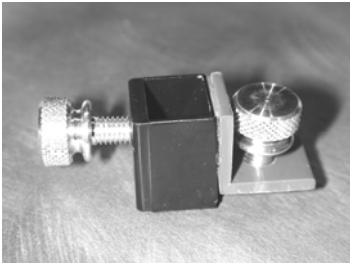
- 4) Connect supplied power cable to 12v DC Source (Trailer battery or equivalent). It is not recommended to charge battery or have generator running while system is in use. If generator is used, high voltage transient suppression equipment connected in line is recommended. Solid black wire is **NEGATIVE**; Black with white stripe wire is **POSITIVE**. ***IMPORTANT*** **Fuse positive power cable with a 5amp quick blow fuse.** Power down system before disconnecting power to avoid data loss. Do not lengthen power wires. If you have a 110AC power outlet, an adapter is available to connect to system: Part# ALT-PWC-POWER-ADPT

MOUNTING ANTENNA

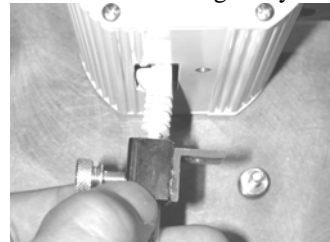
Mount antenna for paging option as high up as possible on top edge of trailer. Do not mount above top of trailer. Mount to trailer, not to a post or other fixture. Antenna can be thru hole mounted in top of trailer or attached to trailer with angle bracket supplied. Follow instruction supplied with antenna for installation. ****NOTE**** Rod length of antenna does not need to be altered. To mount on post Part # PWC-ANTENNA-GPA is needed!

Cable Lock Installation

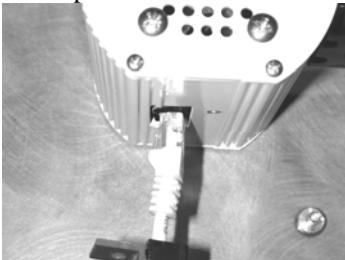
Step 1: Assemble Parts as shown below



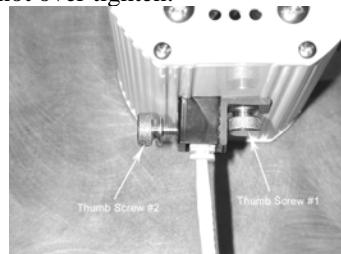
Step 3: Slide Cable Lock over the cable and tighten thumbscrew #1 to fasten to Sensor Housing Body.



Step 2: Slide Cable Lock over cable. Then snap cable into sensor housing.



Step 4: Tighten thumbscrew #2 snugly to provide strain relief. Please do not over tighten.



*Note: To remove cable, both thumbscrews need to be loosened and lock needs to be slid back on cable before cable is detached from connector.

GETTING STARTED

Press “MENU” key to turn unit on. Unit will automatically turn off after 2 minutes if no keys have been pressed.

GREETING MESSAGE

The PerformAIRE
By ALTRONICS
O2 EQUIPPED
VERSION 2.*

"O2 EQUIPPED" will only appear if the unit was purchased with an oxygen sensor.

DATA BASE #1
ET MODE Selected
Multiple Run Prediction
Wind Prediction Enabled

Second greeting message above will show the following info about the “Setup” of the unit: Data base, prediction mode, prediction type, and wind effect.

KEYPAD FUNCTIONS

MENU/ON key - Turns unit **ON** and allows the unit to leave any current menu and return to the MAIN menu.

SCROLL key - used to view runs that have been stored in the database.

CLEAR/OFF key – Turns unit **OFF** when pressed from MAIN menu and allows runs to be deleted from the database and allows the user to reenter a value if the wrong key was pressed.

ENTER/HOLD key - must be pressed after keying in a value to confirm the value is correct. When pressed in SAMPLE AIR mode the air sample is held in memory and can be used for data entry later on.

MENUS

MAIN MENU - When unit is turned on the MAIN menu automatically is displayed after the greeting message. The user can make one of the nine following choices at this point:

SAMPLE AIR	= 1 (Current Data)
SET UP	= 2
RUN ENTRY	= 3
PREDICT	= 4

Hit the "MENU" key again and see:

DOWNLOAD	=5
SET CLOCK	=6
BAD RUNS	=7
WIND SETUP	=8

Hit the "MENU" key again and see:

PAGER SETUP	=9
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Refer to Appendix for MENU chart

SAMPLE AIR

By pressing "1" (SAMPLE AIR) from the MAIN menu the unit displays all the sampled air parameters and the PREDICTION in the following format:

DATE	TIME
TEMP	HUMIDITY
PRESSURE	OXYGEN (if equipped)
ALTITUDE	PREDICTION (ET or TS)

After 2 seconds the following is displayed:

DATE	TIME
WIND SPEED	WIND GUST WIND DIRECTION
DEW POINT or GOW	VAPOR PRESSURE
CF	PREDICTION (ET or TS)

Wind information will only be shown if WIND is Enabled (See WIND SETUP) and Wind Sensors are installed.

WIND DIRECTION: H-HEAD T-TAIL C-CROSS CT-CROSS TAIL CH-CROSS HEAD

Pressing the "ENTER" key while viewing current data will **HOLD** the data to be used for entering runs. To view the "Held" data you can press the HOLD key when you are at the main menu.

The third and fourth line on the display will alternate from showing Pressure(") and Oxygen(%) to Dew Point(°F) and Vapor Pressure(") and Density Altitude(DA) to Horsepower Correction Factor (CF). Dew Point can be replaced to show Grains of Water (GOW). See SETUP.

NOTE: Barometric Pressure

The Pressure reading is "Absolute", which means it will **NOT** agree with the weather channel or local forecast. This is due to the fact that the local forecast is gives a corrected pressure reading that is compensated back down to sea level. If you were to stand at your local airport and dig a hole down to sea level the PerformAIRE pressure reading would then agree with the local airport reading!

The PREDICTION will be shown only after two runs in ET mode and three runs in TS mode have been stored in the selected database. If less runs have been stored "***" will appear in the place of the PREDICTION value.

SET UP

By pressing "2" from the MAIN menu the unit enters SET UP. Set up allows for configuring any one of the 10 data bases or selecting weather variables to be displayed. Each data Base hold 40 runs.

The first menu appears...

Setup Data Base =1
Setup Weather =2

Setup Weather:

Pressing "2" displays the following menu and prompts the user to select "1" or "2" to display Grains of Water(GOW) or Dew Point(Dp F) when sampling the air.

Shows Grains =1
Show Dew Point =2

Setup Data Base:

Pressing "1" displays the following screen and prompts the user to select one of the 10 available data bases.

Select Data Base
Yes = 1 No = 2

Pressing "1" displays:

DATA BASE #1
Yes=1 Next =SCROLL

Use the SCROLL key to change databases and then press "1" to select displayed database.

After selecting a database you will be asked if you want to clear all the runs out of it:

CLEAR RUNS?
Yes = CLEAR No = ANY KEY

You will now be asked if you want to rename it. Note: You can use the default name if you wish "Data Base #1".

To enter a new name use the "SCROLL" key to change the letter. When the letter is correct select Yes by pressing "1" and you will go on to the

next letter. When all the letters have been selected press the "ENTER" key to save the name.

After selecting a data base the following is displayed:

ET MODE = 1

TS MODE = 2

Press 1 OR 2

By pressing "1" sets the unit to the ET MODE. This means all runs added to the data base will be stored in the ET section and the PREDICTION will be an ET computed from the stored runs and the present ALTITUDE.

By pressing "2" sets the unit to the TS MODE (Throttle Stop Mode). This means all runs added to the data base will be stored in the TS section and the PREDICTION will be a TS or timer setting computed from the stored runs and the present ALTITUDE.

After pressing "2" another menu is displayed as follows:

TS MODE SELECTED

Index = 9.90

CHANGE?

YES = 1 NO = 2

If the user presses "1" the following will be displayed:

ENTER INDEX

Now the user can enter an index, such as 8.90, then he must press the ENTER key.

Select Method

For Prediction

Multiple Runs =1

One Run =2

Multiple Runs:

When the multiple run prediction method is selected, predictions are then calculated from the runs stored in the data base.

Predict with

DA=1 OA=2

ADR=3 VP=4

Now you must choose which weather variable to reference your prediction against. The standard is to use DA or OA (if the unit is oxygen sensor equipped), but you can select ADR or VP if you wish.

One Run:

When One Run prediction method is selected you must set your base run and performance ratios.

Set Base Run=1
Set Pred Value=2
View Values=3
Done =ENTER

Set Base Run:

Your base run data should be taken from a “good run” or your last “good run”. You can update this data as you wish.

Enter Base Run
DA=
ET=
Timer= (if in TS mode)

Temperature= (if fuel type=Alcohol)
Humidity= (if fuel type=Alcohol)

Set Pred Values:

Set Pred Values allows you to select your gas type and your DA to ET and TS to ET ratios.

Select
Gas=1 Alcohol=2

Now you will be prompted to choose between preset ratios or allowed to enter custom ratios.

Preset Ratios=1
Custom Ratios=2

Custom Ratios:

Enter DA Ratio

Enter how many foot of Altitude it takes to move you vehicle 0.01sec in ET. (Ex: 150 means it takes 150’DA to make ET change 0.01sec)

Enter TS Ratio

Enter ratio that it takes to move ET of vehicle 0.01 sec. (EX: 2 means it is a 2:1 ratio or takes two 0.02 to move car 0.01 in ET)

View Values:

Allows you to view your base values and ratios.

Predict with
DA=1 OA=2
ADR=3 VP=4

Now you must choose which weather variable to reference your prediction against. DA is the standard.

Wind Prediction:

If you have chosen Multiple Run Prediction you will be prompted to select to use wind correction in the ET or TS predictions:

Predict w/Wind?
PRESS 1=Y 2=N

If you enable wind correction you will be prompted to select a vehicle type:

Select Car Type
Dragster=1
Door =2
Roadster=3

Next you can adjust the wind effect.

Adjust Effect?
Press 1=Y 2=N

Wind factors have been programmed to correct prediction for wind based on speed and direction of wind. You can further adjust the amount of correction by selecting to Adjust Effect:

Enter Value
Default (5)
(1-10)=

Selecting <5 means you are lessening and >5 increasing the wind correction.

The information in this box is only relevant if your unit is OXYGEN SENSOR EQUIPPED.

After pressing the ENTER key (from above) the following will be displayed:

PREDICT WITH
DENSITY ALT = 1
OXYGEN ALT = 2
PRESS 1 or 2

If your unit has the optional oxygen sensor you can choose to predict your ET or TS value with density altitude or oxygen altitude.

The unit will compute and store the density altitude and oxygen altitude after every sample. This means that when you add a run to your database, the unit will automatically store both altitudes.

This enables you switch between predicting with either altitude and seeing how your stored runs compared with each.

RUN ENTRY

By pressing "3" (RUN ENTRY) from the MAIN menu the unit displays the following:

VIEW/DELETE RUNS	= 1
ADD RUNS	= 2
TSR	= 3
Or	
RATIO/SLET	= 3

“TSR” (throttle stop ratio) is only displayed if the unit is in TS MODE and more than two runs have already been stored. Pressing "3" displays the throttle stop ratio.

“**RATIO/SLET**” is displayed only if the unit is in ET MODE and more than two runs have already been stored. Pressing 3 displays your SEA LEVEL ET and your ALT/ET ratio. Your ALT/ET ratio tells the amount of change in ET there is for every 100’ of altitude change.

By pressing "1" you can view or delete runs you have already stored. Use the SCROLL key to view runs. If you want to delete a run you have scrolled to press the CLEAR key. By pressing the ENTER key when viewing a stored run it will show the Temperature, Humidity, and Pressure values stored for that run.

By pressing "2" the following ADD RUNS menu will be displayed:

Store with->	
CURRENT	= 1
HELD	= 2
MANUAL	= 3

You can store a run by using the current weather conditions by selecting 1, by using the “held” data that you saved by earlier by selecting 2, or by entering your own values by selecting 3.

After selecting 1 or 2 the following will be displayed:

Enter Run Info->
DA=1000 (Example)
1000' ET=
ET=
TS=

The DA or OA will already be loaded. You should enter a 1000' ET, a final ET, and TS. The 1000' ET is optional and is used for run completing. You do not have to enter every run with a 1000' time in order to use run completing. The TS will only be entered if the unit is in TS MODE.

To use run completing press the ENTER key when prompted for the final ET.

If manual entry is desired you must select number 3. After selecting 3 the following is displayed.

ENTER AS
Altitude =1
Temp, Hum, Press =2
Press 1or 2

If 1 is selected you will have to key in the DA or OA value. If 2 is selected you will have to enter the temperature, humidity, pressure, and oxygen values. Then the DA or OA will be calculated.

****HINT****

The easiest way to enter a run is by starting from the main menu and pressing the keys 3, 2, 1, and ENTER. Now all you have to do is type in your ET's and the run is stored.

RUN COMPLETION

In order use the run completion program effectively at least one previous run must be entered into a database with a 1000' ET. To use run completion all you need to do is enter the 1000' et of the run you want to complete and then when it asks you to enter your final ET= simply press the enter key without any value. You will then see a *Run Completing!* message appear followed by ET=10.203 (example) your completed ET. This run will then be saved automatically and the main menu will be brought back, unless you are in TS mode, in which case, you will then be prompted to enter your TS.

1/8 Mile Tracks

Keep 1/8 mile and 1/4 mile runs in separate databases. You may want to name the database appropriately.

If you run 1/8 mile and want to be able to use *run completion* you must enter in a 330' time when the unit prompts you to enter the 1000' time. In regards to entering your ET for an 1/8 mile track simply enter in the 1/8 mile time.

PREDICT

Depending on the mode the unit is in (ET MODE or TS MODE) by selecting "4" you can input any altitude and the corresponding ET or TS prediction will be displayed. You need to have two or three runs respectively in the database before you will see the prediction.

Wind Correction:

If wind correction has been enabled you will be asked to enter the wind speed and direction for each run entered.

Enter Wind Speed

MPH=

Enter Wind Dir

Head=1 Tail=2

CH=3 Ct=4 Cross=5

DOWNLOAD

By pressing “5” you will begin downloading into a personal computer if you have purchased that option.

To install software:

Place DISK 1 in drive a:\ and run SETUP. Follow the instructions on the screen to finish installation.

- 1) **COMPORT** button - To download PerformAIRE connect supplied cable to unit and to serial port on back of computer. You can use serial port 1 or 2. You must make sure that you select a port that is not being used by another device such as a modem or you will get an error. (Cannot setup port, in use by another device).
- 2) **DOWNLOAD** button - Follow instructions on the screen to complete the download.
- 3) Once downloading is complete a data base info screen will pop up showing runs and various statistical parameters regarding your data. Some parameters may not be enabled depending on the setup of your PerformAIRE and the options your unit has. If you want to graph the database you just downloaded, you first need to **reselect** the database.
- 4) **SELECT DATA BASE** button – Allows you to load any previously downloaded database. A sample database is included (sample.dat).
- 5) **GRAPH DATA BASE** button – This feature generates a graph the plots out your runs in reference to your prediction line. Each run is show in Red or Blue depending on the mode your PerformAIRE is in and Bad Runs are shown in yellow. Bad Runs are runs that do fit well with your other runs. You can use your mouse to select any run and the data values for that run will be shown in ET and Altitude value boxes.
 - A) **ZOOM** button – instructs you on how to use the zoom
- 6) Parameter definitions:

Entries:	Number of runs in database.
Mode:	Shows if database is set to Throttle stop or ET prediction.
Sea Level ET DA:	ET car will run at 0' density altitude.

Sea Level ET OA: ET car will run at 0' oxygen altitude.
(Optional)

Alt Ratio DA: Time in seconds ET will change with a
100' change in density altitude.

Alt Ratio OA: Time in seconds ET will change with a
100' change in oxygen altitude. (Optional)

TS Ratio DA: Time in seconds Throttle Stop will need to
change in order to change ET of car
0.01sec in density altitude.

TS Ratio OA: Time in seconds Throttle Stop will need to
change in order to change ET of car
0.01sec in oxygen altitude. (Optional)

SET CLOCK

By pressing "6" from the MAIN menu the unit will prompt you to enter the DATE and TIME.

BAD RUNS

By pressing "7" from the MAIN menu the unit will display any runs that do not "fit" with the rest of the data. These runs will not be removed; you will have to clear them out of the database yourself.

Example:

Run #1:	Run #2	Run #3
DA = 1000	DA = 2000	DA = 1800
ET = 10.10	ET = 10.20	ET = 10.21

With these 3 runs in a database BAD RUNS would display:

Run

3

does not fit.

The reason Run #3 does not fit is because the run should have been faster than Run #2 since it is 200' DA less in altitude.

It is now necessary for Run #3 to be removed from the database. To do this you must use the View/Delete option in the Run Entry Menu and Clear out Run #3.

There may be times when multiple runs are shown that not to fit. When this occurs it is often useful to use the **downloading software** to help determine what is going wrong.

WIND SETUP

By pressing "8" you will the following will be displayed.

ENABLE =1

DISABLE =2

Press 1 or 2

ENABLE allows the wind information to be displayed on CURRENT DATA if sensors are installed.

DISABLE removes wind information.

PAGER SETUP

By pressing “9” you will the following will be displayed.

Enable Pagers = 1
XMIT TIME = 2
XMIT DATABASES = 3

Selecting “1” displays:

HOW MANY?_

Enter the number of pagers that are being used with the system.

Enter CAPCODE#1=

0996151

Enter the 7-digit pager capcode found on back of pager.

Select Baud Rate

1=1200 2=2400

1200

Select 1 or 2

Select the baud rate from back of pager. Do this for each pager you are using.

Selecting “2” displays:

Enter Time (min)=

—

Enter time interval between pages. Minimum time is 2 minutes.

Selecting “3” displays:

Multipage Y=1,N=2

Enter Yes if you want to transmit the prediction for multiple databases.

Enter No if you only want to transmit the prediction for the database selected during SETUP.

If you selected Yes for Multipage the following is displayed:

Page this DB?

DATA BASE # (shows name of data base)

Yes=1 Next=SCROLL

Done=ENTER

For every data base that you want to send predictions for press “1” otherwise press “SCROLL” to go to the next Database or press “ENTER” if you are done selecting databases.

OPERATING PAGER

To turn system ON:

- 1) Turn the PerformAIRE Weather Center ON and select menu item 1-SAMPLE AIR to show the Current Data from the main menu. Turn pager on. A page will be sent every 2 minutes with updated conditions and prediction.
- 2) 20 of the most recent pages will be shown at the top of pager. When the 21st page is received the 1st page will be deleted. Any of the 20 pages can be stored in the pagers personal message file. Pager can be set for silent pages or a variety of different tones. Please read included pager instruction sheet for details.

To turn system OFF:

- 1) First turn PerformAIRE unit off. Then disconnect external 12V battery.

Low battery Signals on Pager:

- 1) When a “low batt” signal appears at the end of a received message this indicates that the battery powering the WEATHER CENTER system is low. When the “LOW BATTERY” appears on the pager the battery in the pager is low.

Low battery Signal on PerformAIRE WEATHER CENTER:

- 1) When a low battery signal appears on the console unit it indicates that the 12V battery powering the system is low.

OPERATING LIMITATIONS

The PerformAIRE WEATHER CENTER is designed to operate within the following atmospheric conditions.

TEMPERATURE: 0 to 50 degrees Celsius (32 to 122 degrees Fahrenheit)

HUMIDITY: 0 to 100%

BAROMETRIC PRESSURE: 23 inHg to 32 inHg.

STORAGE

Store the PerformAIRE at a temperature between 20 and 125 degrees Fahrenheit.

CAUGHT IN THE RAIN

If it starts to rain it is recommended that the system be powered down and the sensor pole be taken down and out of the rain.

If the sensor housing does get wet leave system run for at least a half hour so fan can dry housing. The humidity may read high if it gets wet, but will surly dry off and read normal before the race track will dry!

MAKE SURE TO POWER UNIT DOWN BEFORE DISCONNECTING BATTERY!

WARRANTY

The PerformAIRE by **FLIRONICS inc** is warranted for 1 Year against any defect in materials and workmanship from date of purchase. ALL WARRANTIES AND GUARANTEES ARE VOID if the PerformAIRE's enclosure is opened.

FLIRONICS inc shall not be liable for injury, consequential, or other types of damages resulting from the use or misuse of the PerformAIRE

PerformAIRE is to be used for racing purposes only.

ABBREVIATIONS

DA	Density Altitude
OA	Oxygen Altitude
ET	Elapsed Time
TS	Throttle Stop
SLET	Sea Level ET
ALT/ ET	Ratio: change in ET for every 100' change in Altitude
TSR	Throttle Stop Ratio
VP	Vapor Pressure
GOW	Grains of Water grains per pound
DP	Dew Point
ADR	Air Density Ratio
CF	Horsepower Correction Factor

GUIDELINES FOR ACCURATE PREDICTIONS

For ET predicting it is recommended that 5 to 6 Good Runs be entered into a database and that there is a span of at least 1000' feet in DA or OA between the runs.

Ex: Typical Good Data

Run #1 1223' 10.20

Run #2 1301' 10.204

Run #3 1956' 10.236

Run #4 2000' 10.237

Run #5 2245' 10.249

Run #6 2269' 10.25

For TS predicting it is also recommended that 5 to 6 runs be entered into a database and that there is a span of at least 1000' feet in DA or OA between the runs. It is also recommended that there is some variance in the timer settings between the runs. In other words change the timer setting for at least 3 of the runs. The timer should be adjusted enough to cause up to a 0.30 second change in ET. If you normally have about 2 seconds in your timer make a run with 1 second and another with 3 seconds. This should accurately set your TSR.

Good Runs:

1. Altitude goes up, car loses performance/altitude goes down, car gains performance
 2. 60' times consistent, no tire slip
 3. Wind affects minimal, 30 mph head or tail winds are not present
- The more Good Runs and the more altitude span the more accurate your predictions will be.

*****Important*****

It often takes a number of trips to the track to acquire the above-recommended data in order to produce accurate results. Because of this, we suggest using the following method until enough data has been acquired.

Gasoline burning engines:

A 200' rise in DA typically yields a 0.01sec slow down in ET and vice-versa for a drop in DA.

Alcohol burning engines:

A 400' rise in DA typically yields a 0.01sec slow down in ET and vice-versa for a drop in DA.

For TS racers:

Typically the TS ratio is 3:1. This means it takes 0.03sec in the timer to move the car 0.01sec. Use this information with the above DA change to set up your timer.

APPENDIX
MAIN MENU

1 **CURRENT CONDITIONS-** View present weather conditions
2 **SETUP**

- A. **Select Weather**
 - a. **Grains b.Dew Point**
- B. **Select Data Base**
 - a. **Clear runs**
 - b. **Change Name**
- C. **Select ET or TS mode**
 - a. **Enter Index for TS mode**
- D. **Select DA or OA (optional)**

3 **RUN ENTRY-** Enter/View/Delete runs in database

- A. **View Delete**
- B. **Add Runs**
 - a. **CURRENT**
 - b. **HELD**
 - c. **MANUAL**
 - i. **Altitude**
 - ii. **Temp,Pres,Hum**

4 **PREDICT-** Enter prediction mode

- A. **CURRENT**
- B. **HELD**
- C. **MANUAL**
 - a. **Altitude**
 - b. **Temp,Pres,Hum**

5 **DOWNLOAD-** Download data base into PC

6 **SET CLOCK-** Set Date and Time

7 **SHOW BAD RUNS –** Displays runs that do not fit

8 **WIND SETUP –** Enable/Disable

9 **PAGER SETUP**

- A. **Enable Pagers** =1
 - a. **How Many?**
- B. **XMIT Time** =2
 - b. **Enter Time(sec)=_**
- C. **XMIT DATABASES** =3
 - d. **Multipage Y/N**
 - i. **# of DB to XMIT=_**